US005205440A

United States Patent [19]

Matsushita

[11] Patent Number: 5,205,440

[45] Date of Patent: Apr. 27, 1993

[54] **DISPENSING VALVE/COUPLING ASSEMBLY**

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[21] Appl. No.: **879,465**

[22] Filed: **May 4, 1992**

Related U.S. Application Data

[63] Continuation of Ser. No. 604,165, Oct. 29, 1990, abandoned.

[30] **Foreign Application Priority Data**

Nov. 2, 1989 [JP] Japan ..... 1-128894[U]
Jan. 10, 1990 [JP] Japan ..... 2-1440[U]

[51] **Int. Cl.**[5] **B67D 5/00**
[52] **U.S. Cl.** **222/83**; 222/95; 222/496
[58] **Field of Search** 222/81, 83, 83.5, 88, 222/89, 90, 95, 96, 106, 496, 571, 105

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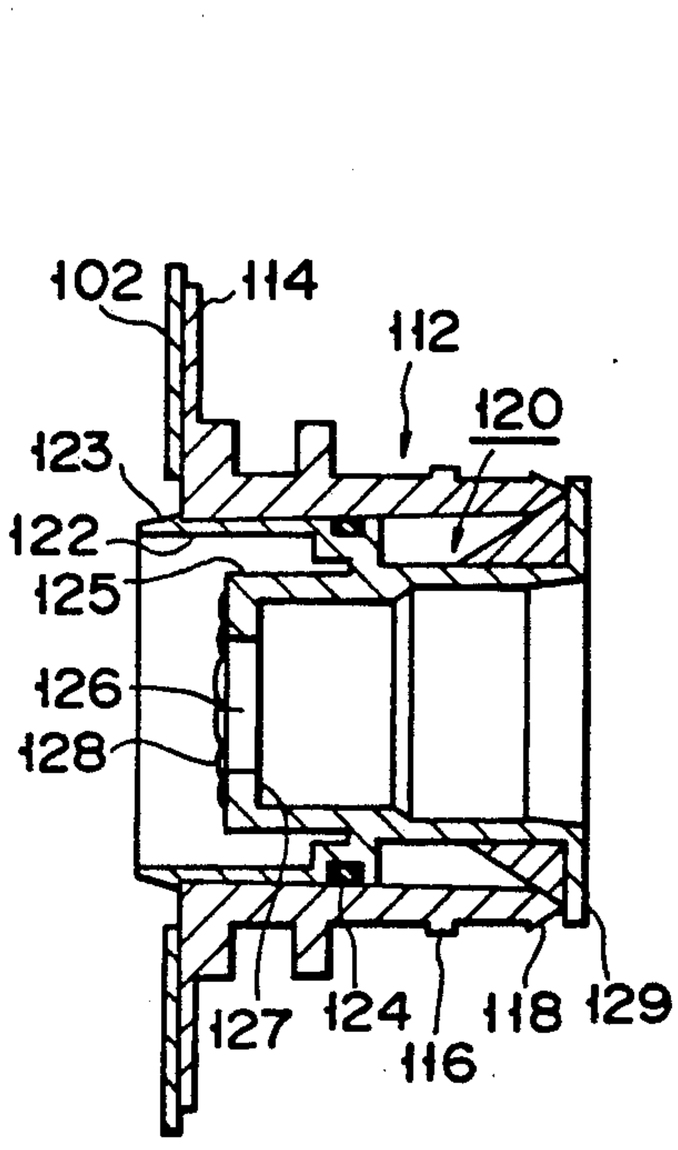
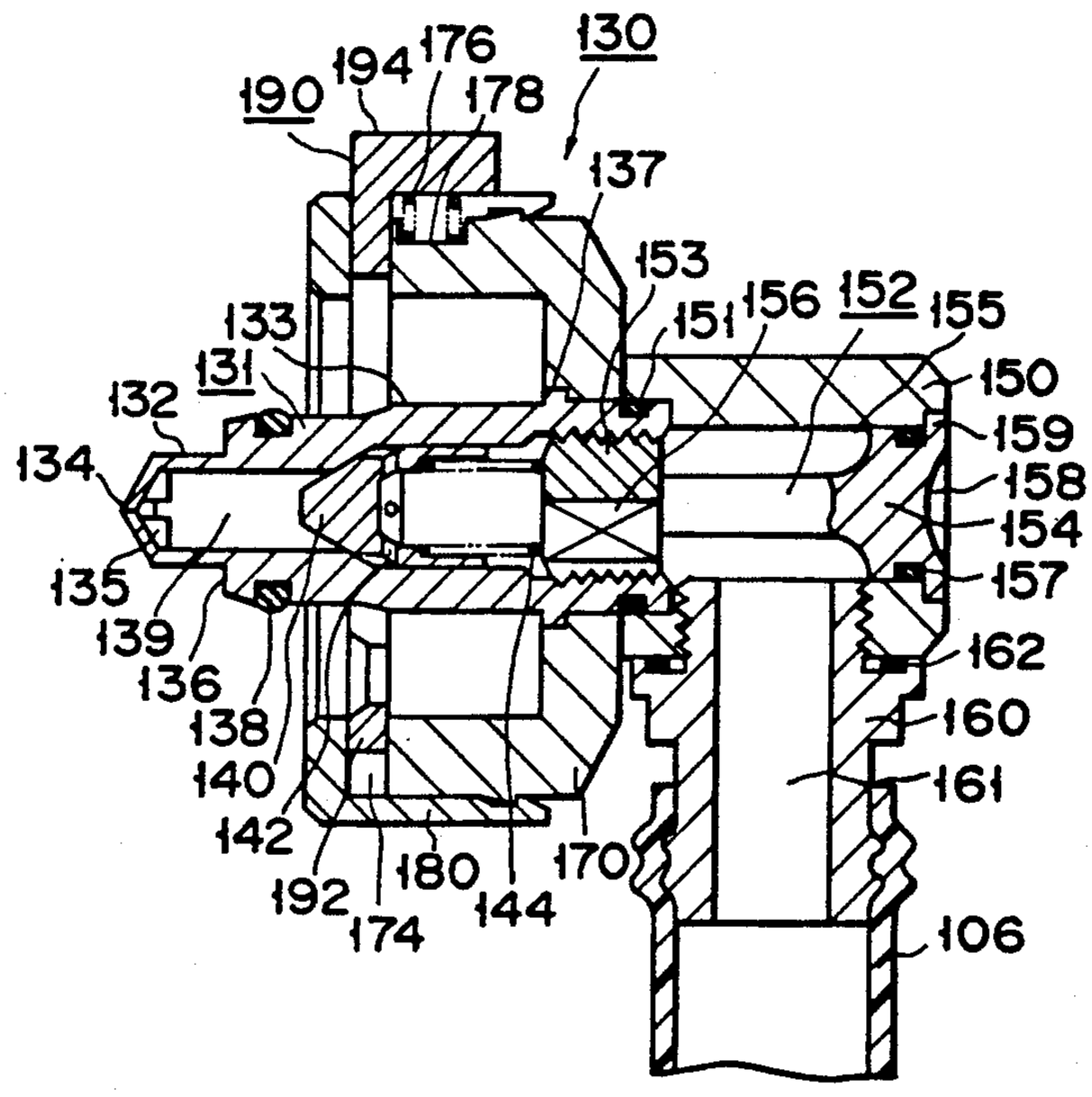
[57] **ABSTRACT**

A coupling of the present invention can be freely detachably attached to a flexible container whose outlet or opening is closed by a seal member broken by the tip of a male connector portion of the coupling. This coupling comprises a cylindrical body having at the tip thereof a hole for sucking fluid in the container, a valve seat formed in the cylindrical body, a valve body arranged in a fluid passing path communicated with the fluid sucking hole, and a spring for urging the valve body against the valve seat. When this coupling is attached to the opening of the container, the seal member by which the opening of the container is closed is broken by the tip of the cylindrical body. When a sucking pump is made operative to suck fluid in the container, therefore, the valve body is drawn against the spring to communicate the fluid passing path with the sucking hole, so that fluid in the container can be collected in a cup through the opening of the container.

5 Claims, 9 Drawing Sheets





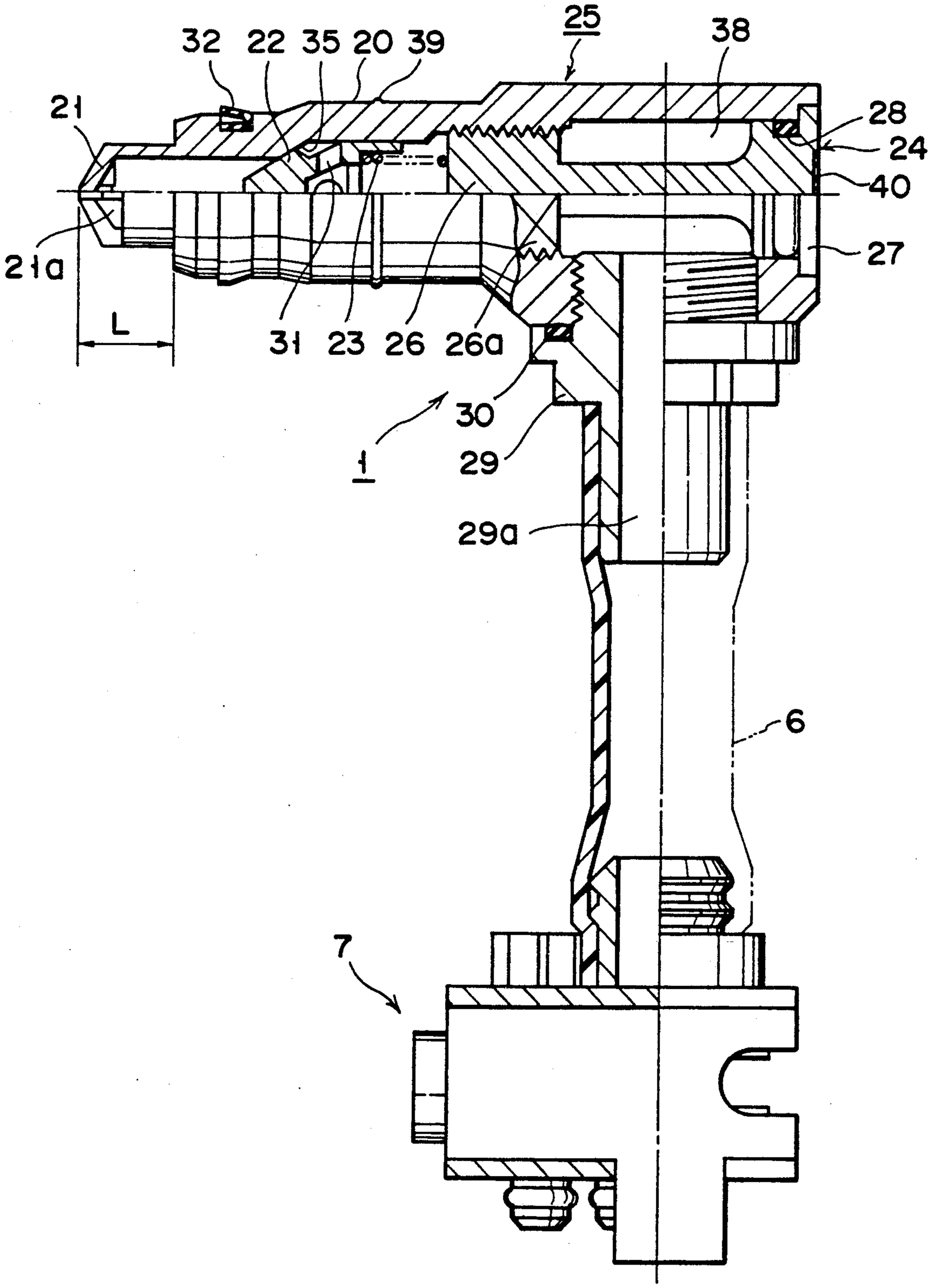


FIG. 1

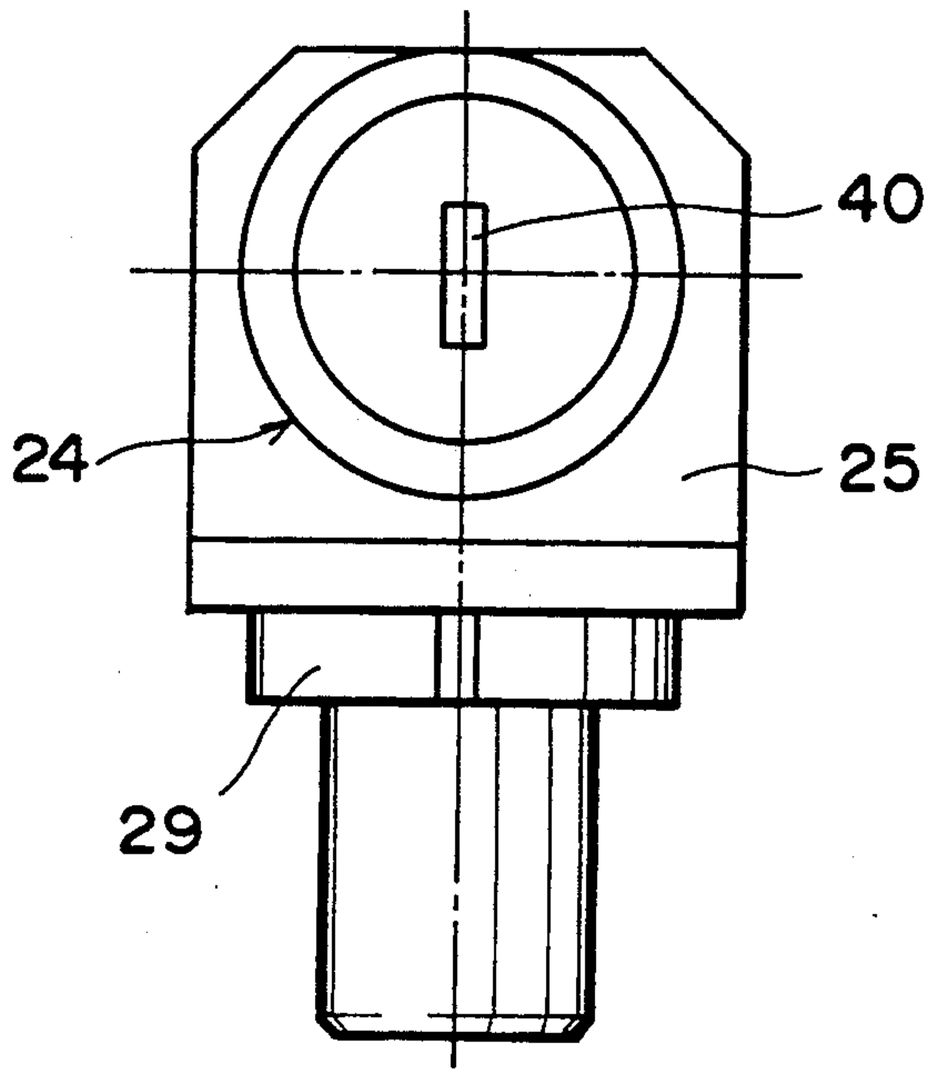


FIG. 2

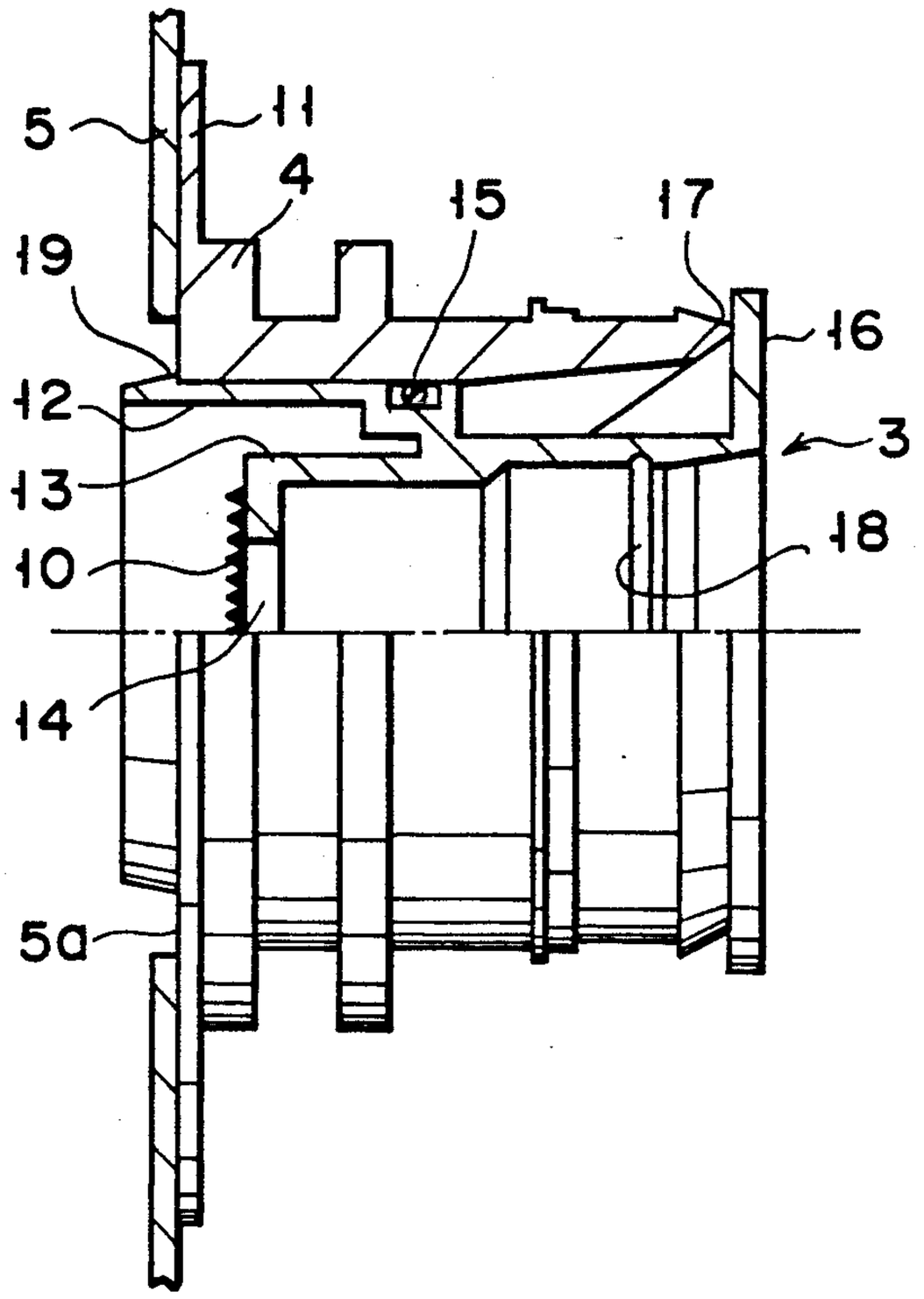


FIG. 3

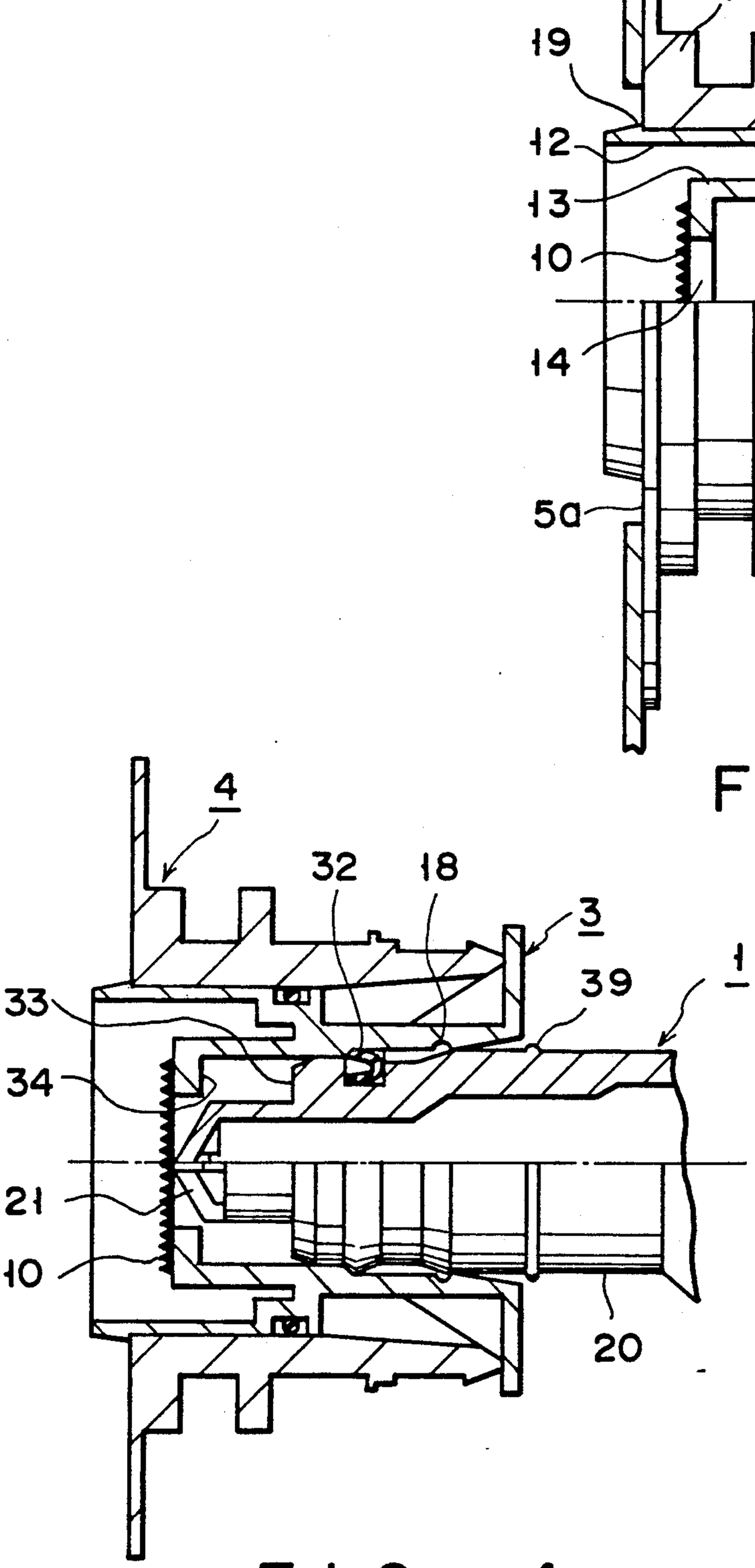


FIG. 4

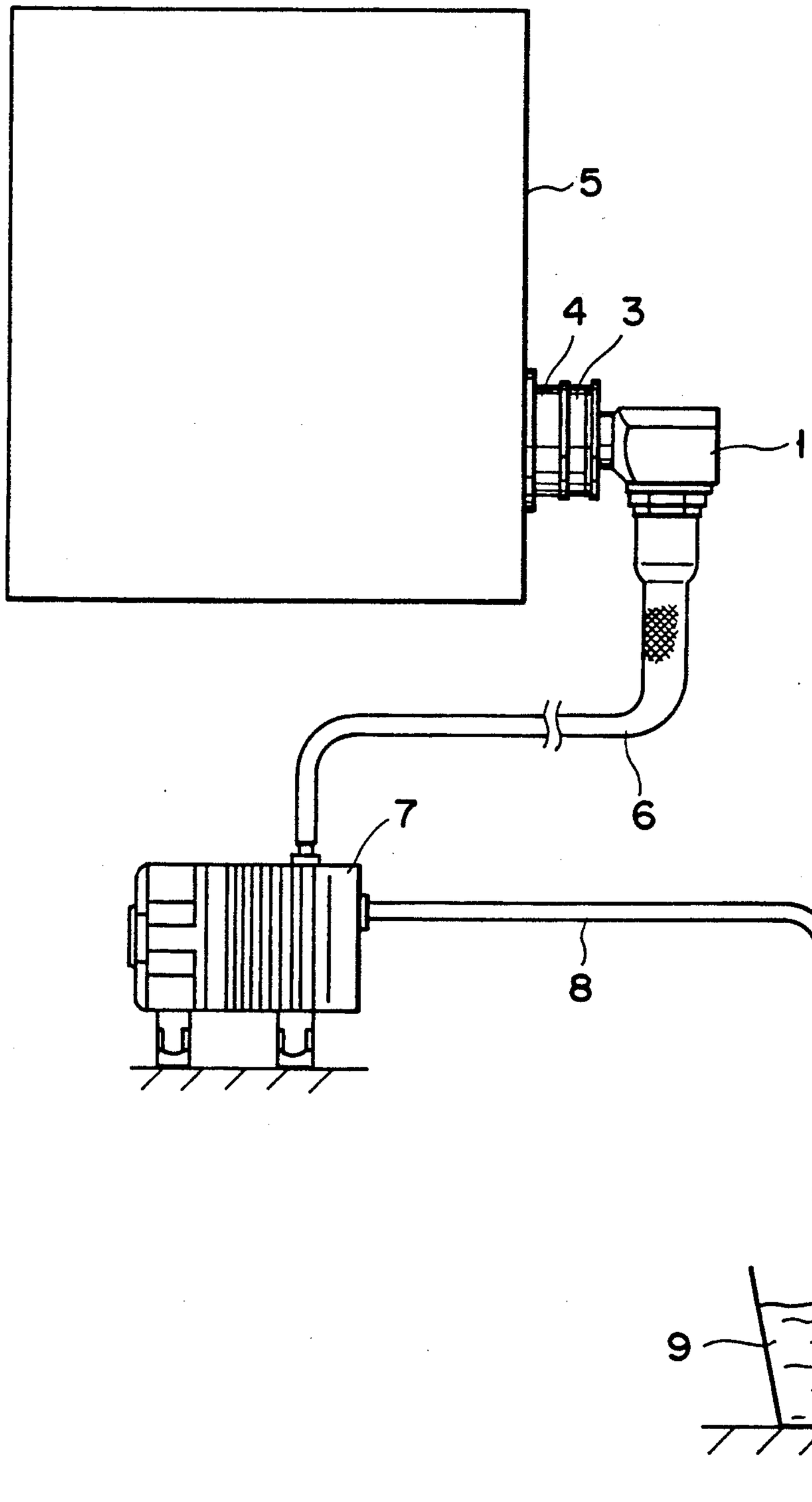


FIG. 5

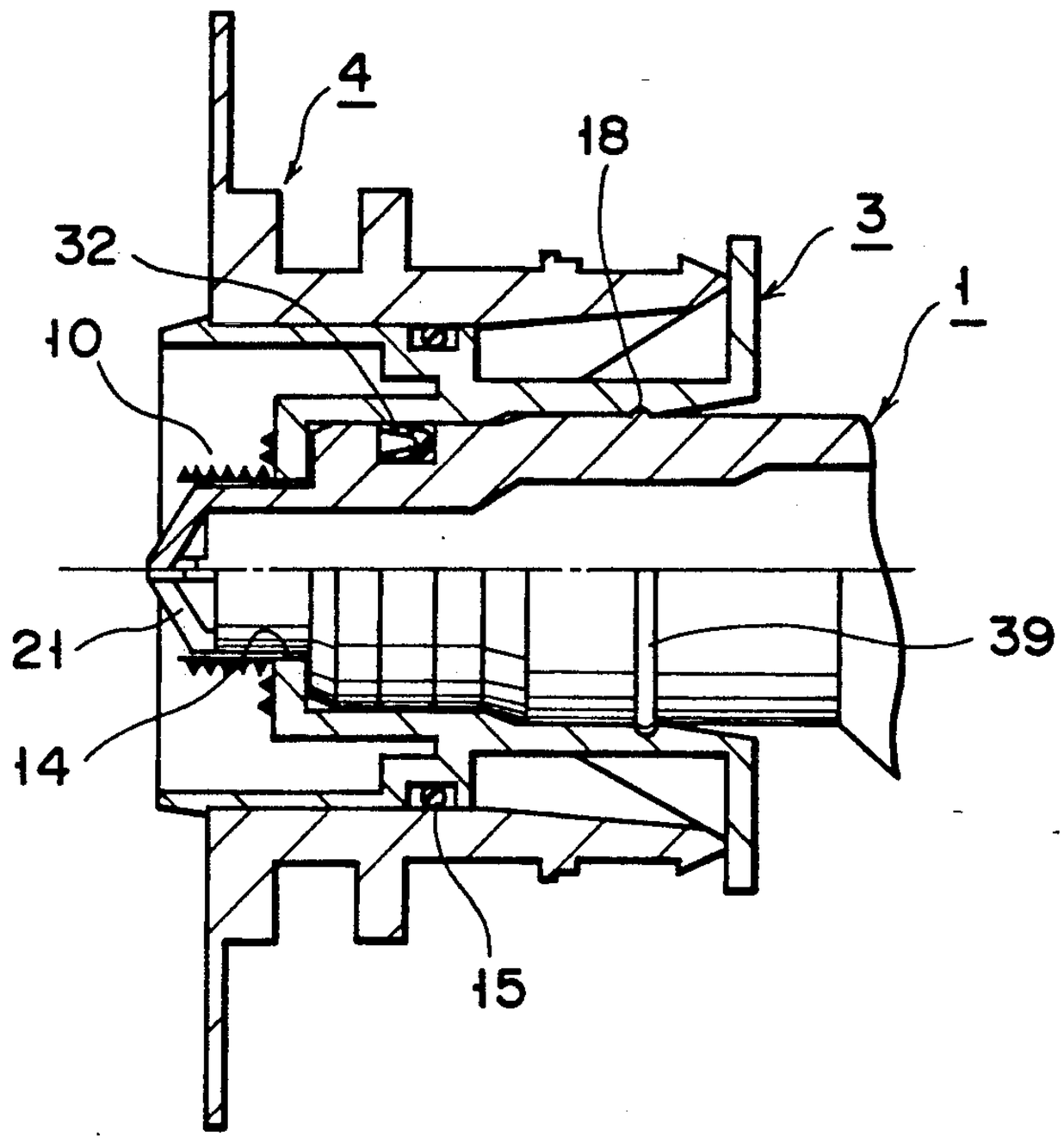


FIG. 6

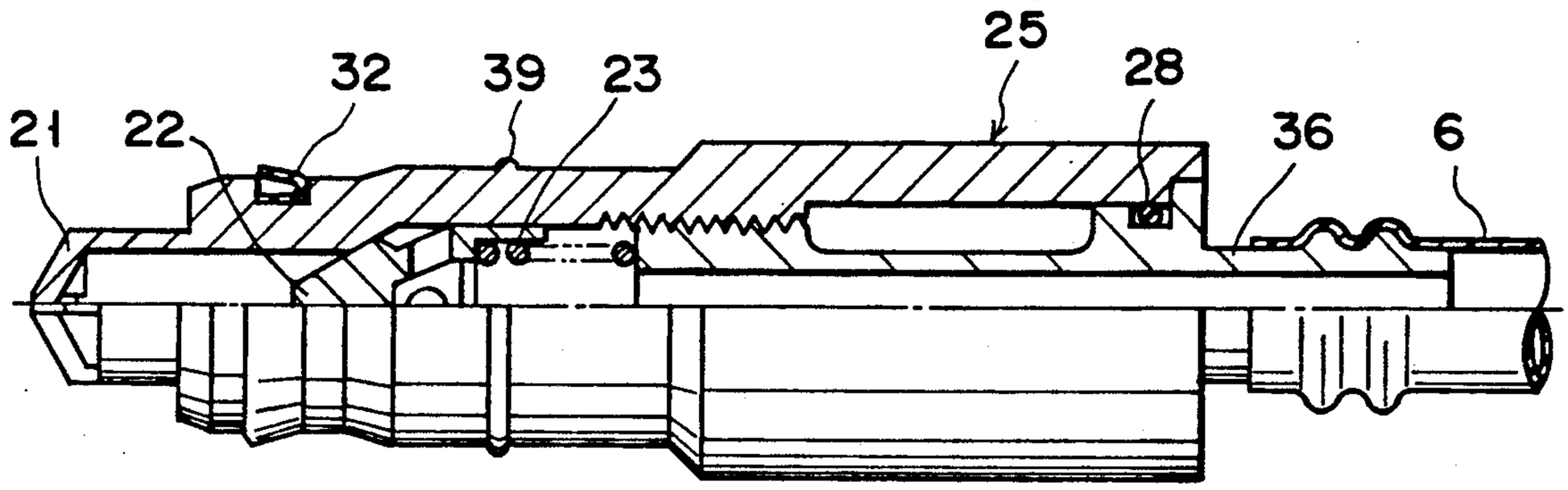


FIG 7

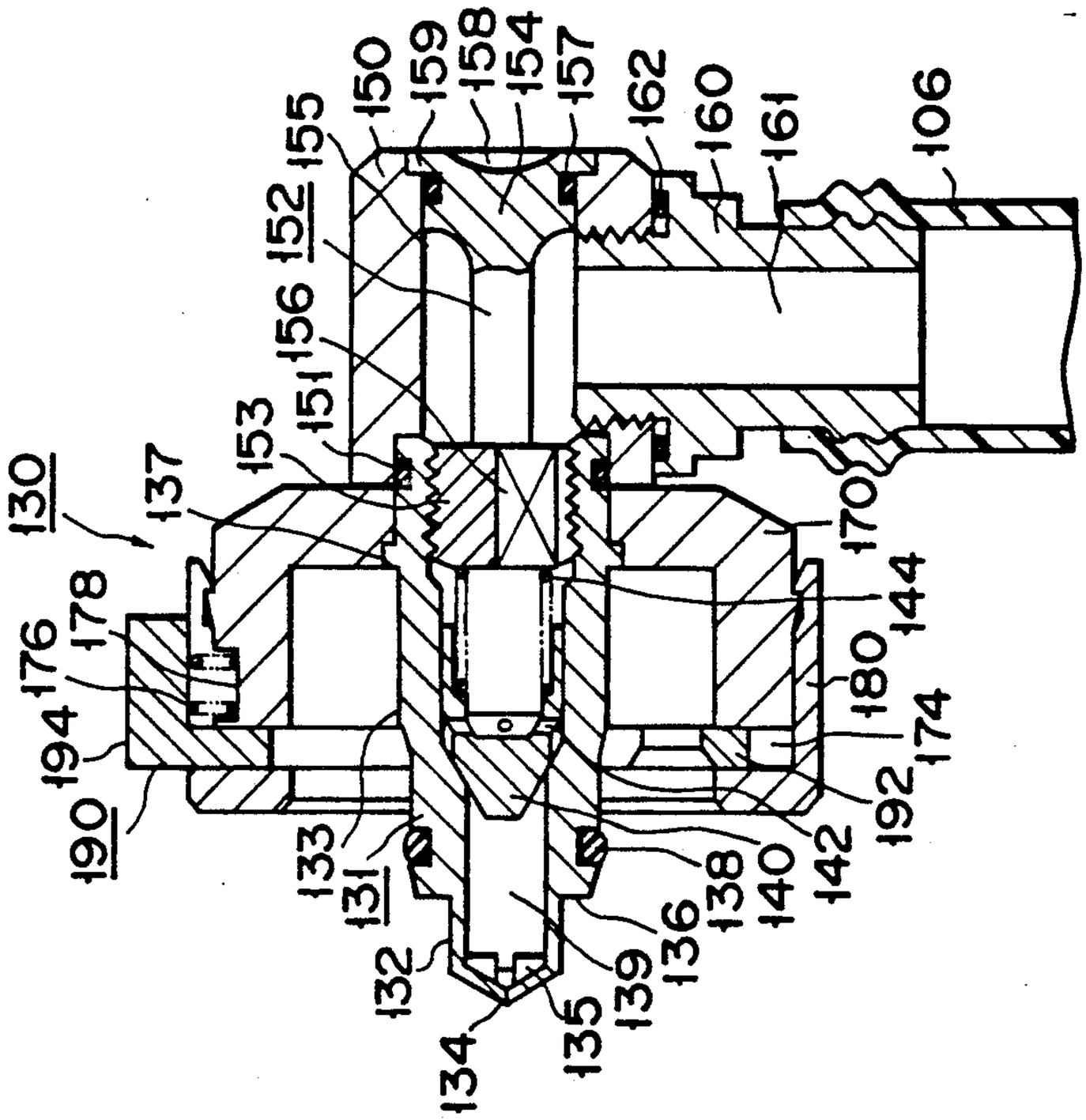

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FIG. 9

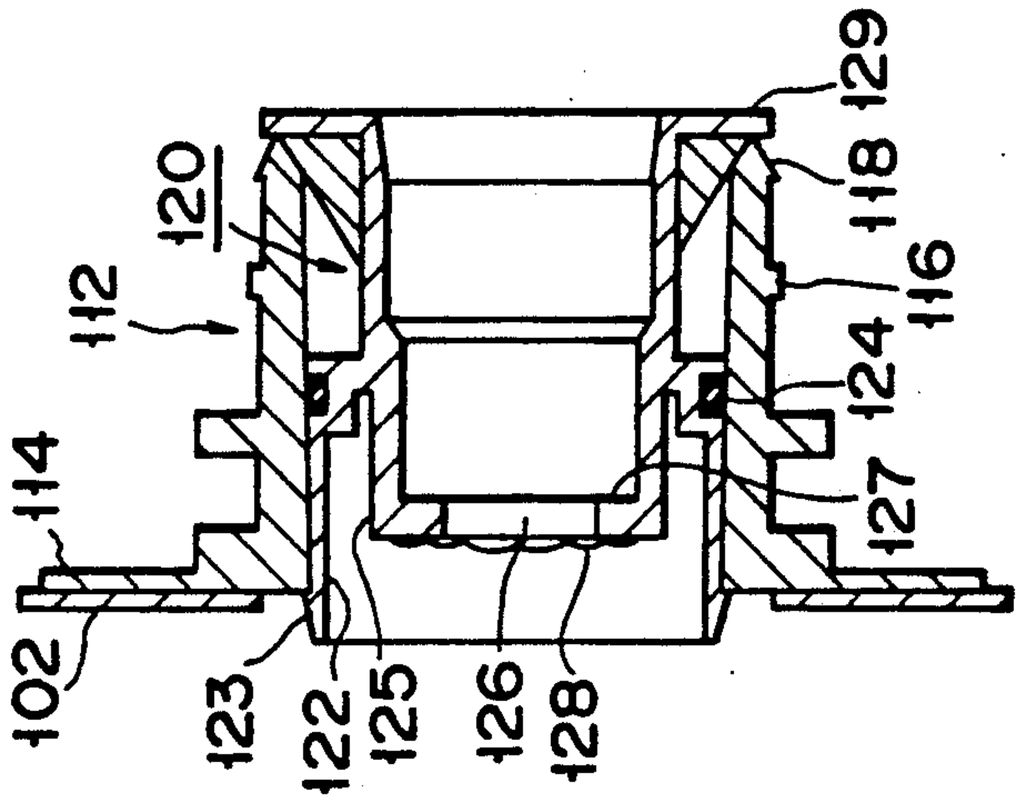
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FIG. 8

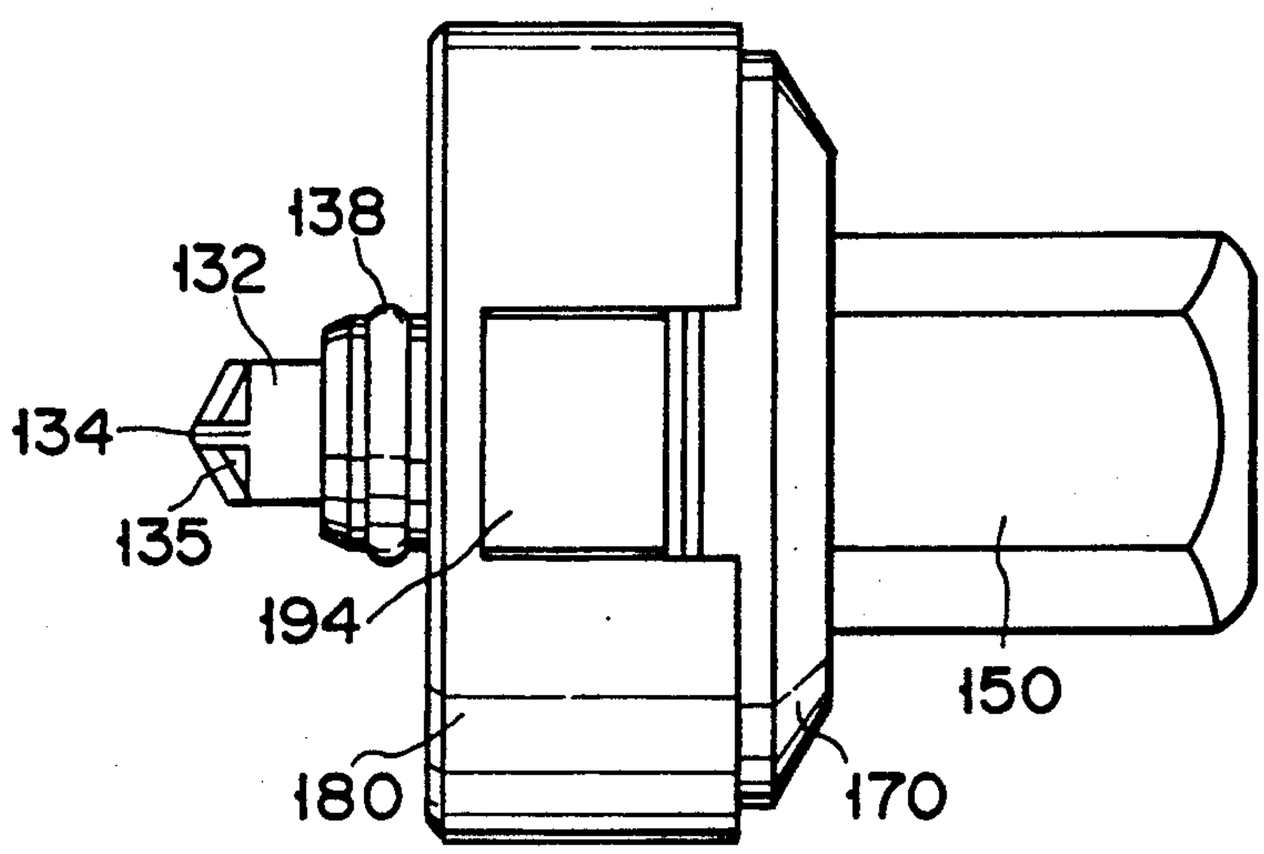
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FIG. 10

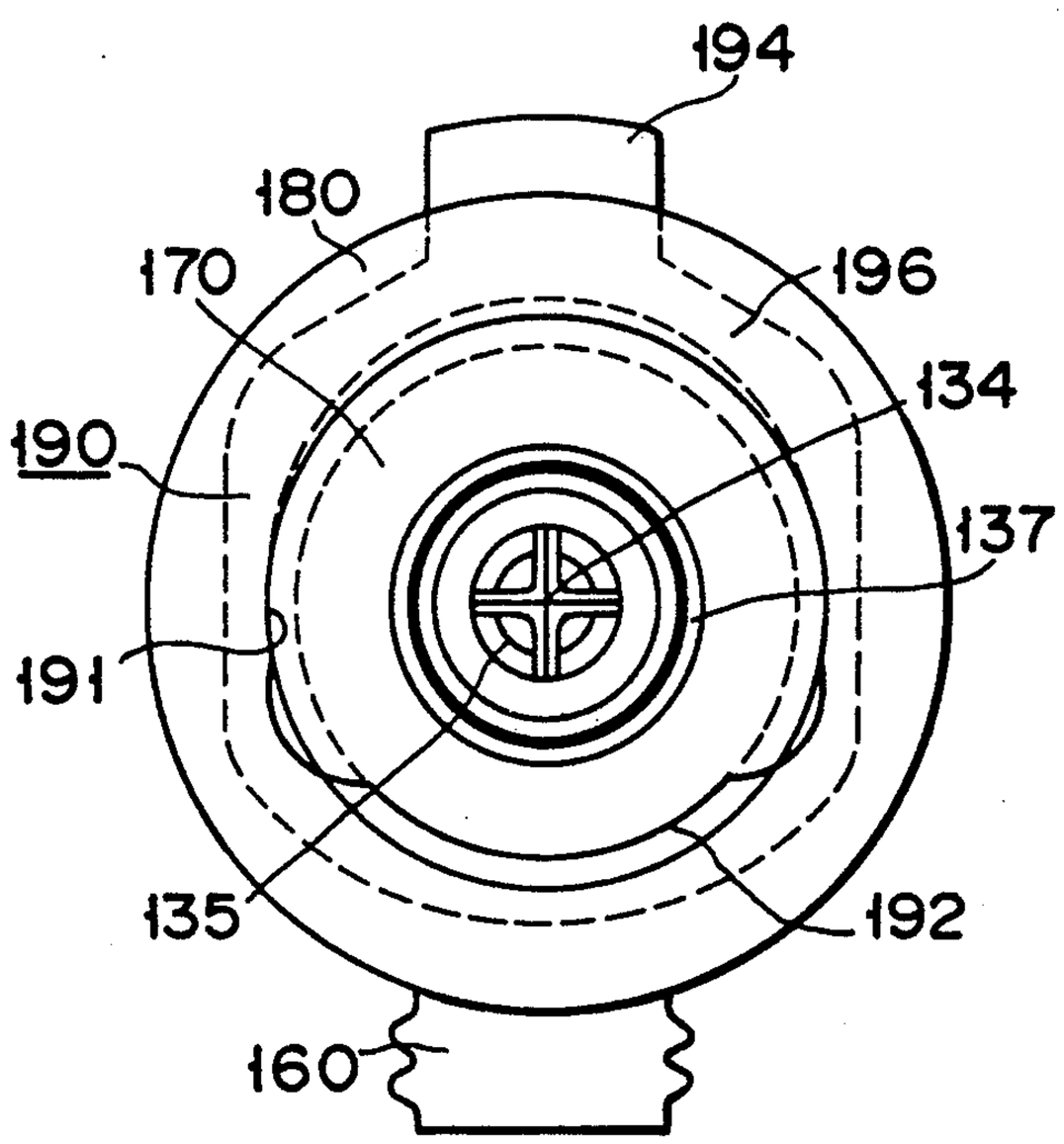
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FIG. 11

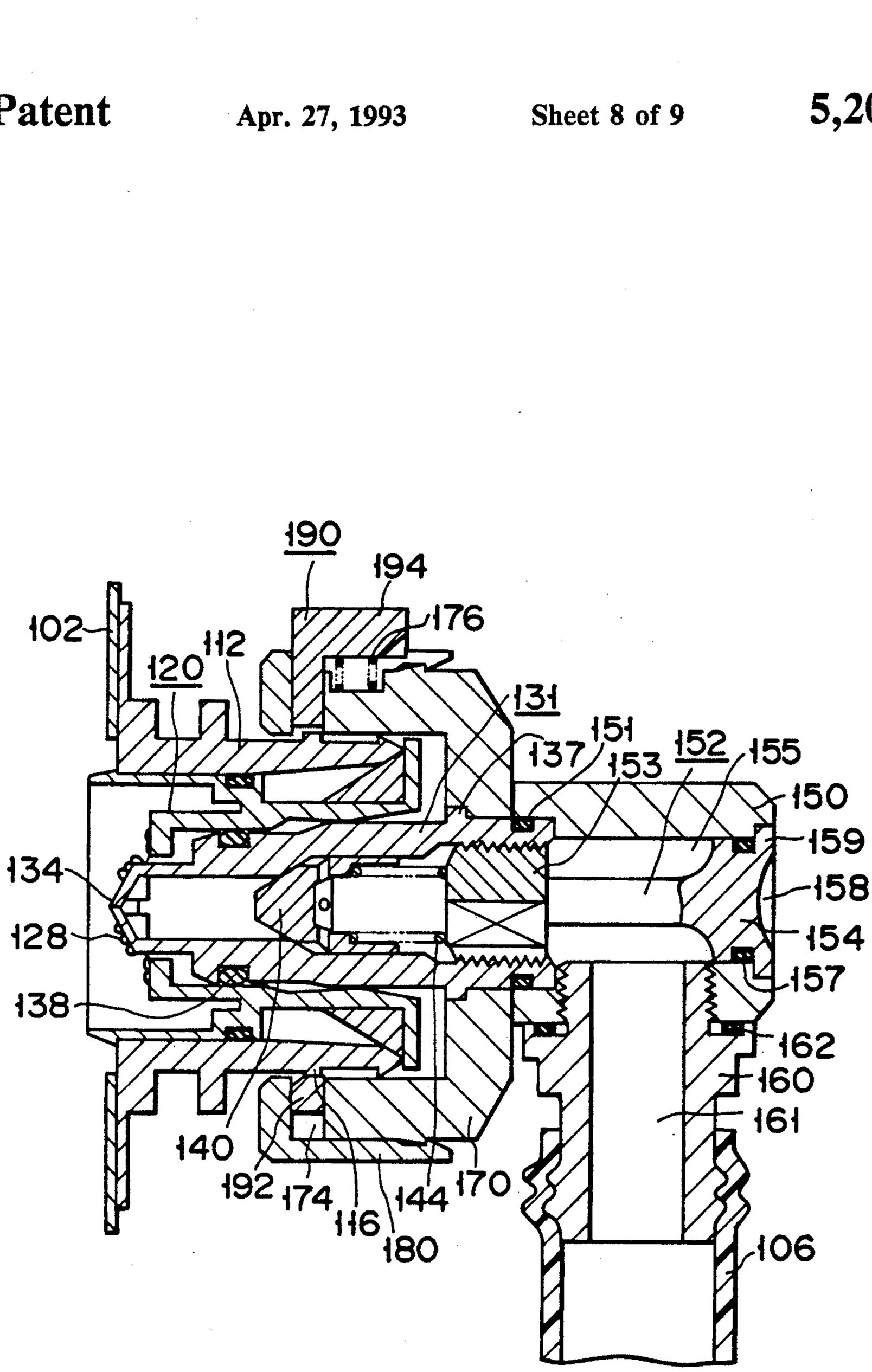
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FIG. 12

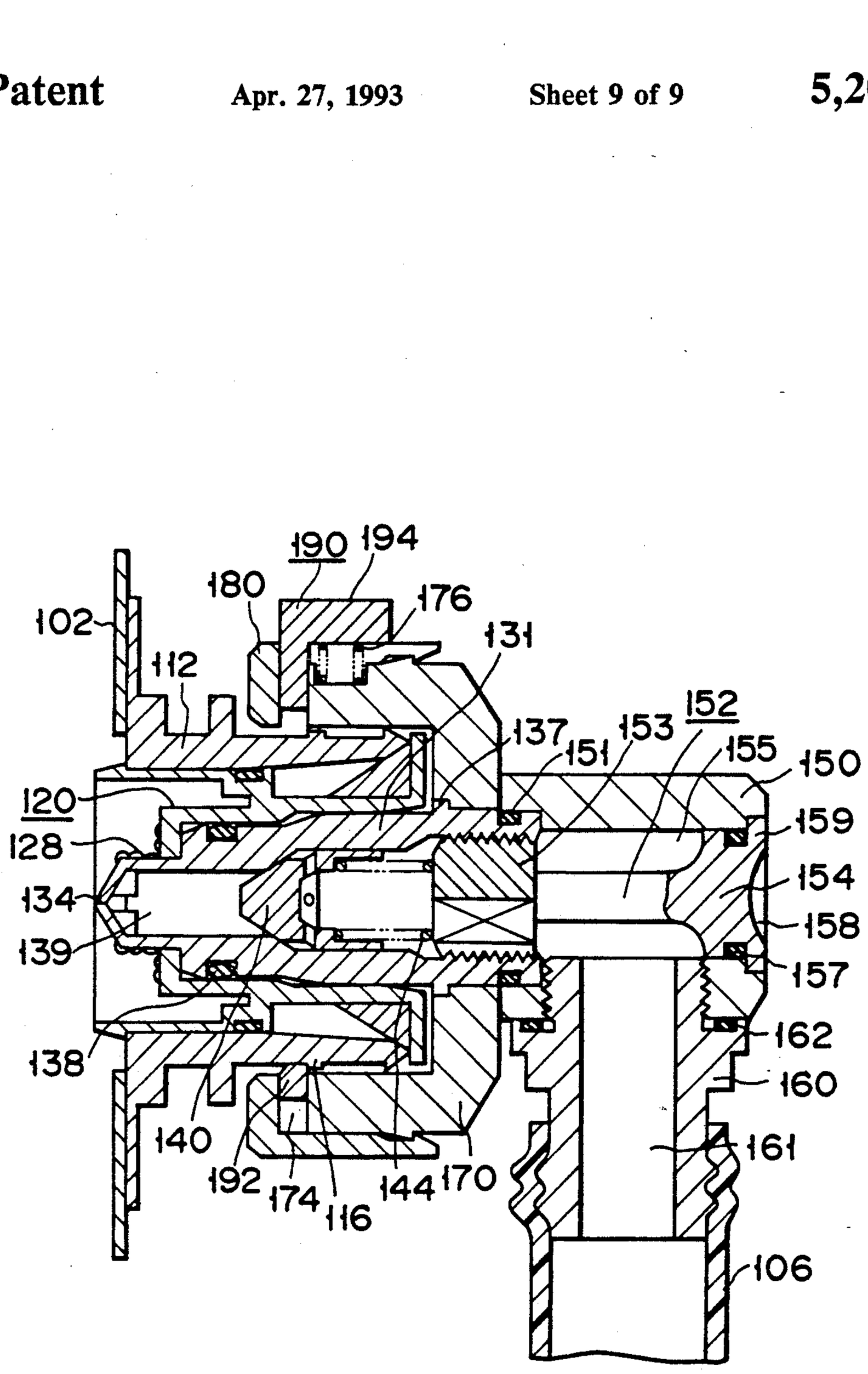
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FIG. 13

DISPENSING VALVE/COUPLING ASSEMBLY

This is a continuation of application Ser. No. 07/604,165 filed Oct. 29, 1990, now abandoned.

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a coupling suitable for the drinking fluid container and capable of picking up a necessary amount of fluid out of the flexible container while keeping the fluid sealed from outside.

2 Description of the Related Art

There has been already developed an automatic vending machine of the bag-in-box (or BIB) type wherein the flexible container (or pouch) made of flexible sheet or film and filled with drinking fluid such as coffee and fruit juice is transported in a box made of corrugated cardboard.

According to this automatic vending machine of the BIB type, its cost can be made low because the container is disposable, and it can be sanitary because fluid in the container can be sucked into a cup by a pump while keeping the fluid shielded from outside.

A coupling connected to the flexible container and then to the piping in the automatic vending machine to allow fluid in the container to be sucked into the cup under this shied state is disclosed by Japanese Patent Disclosure Sho 62-258288 and others.

The coupling disclosed in Japanese Patent Disclosure Sho 62-258288 comprises a female connector attached to the container and a male connector fitted into the female one. When the male connector is fitted into the female one, a hermetic seal bonded to the bottom of the female connector is broken by a tip formed at the front end of the male connector and the container is thus opened. When the male connector is further pushed into the female one, a valve body formed in an inner cylinder of the male connector is opened to communicate the container with a flow path in the male connector an when the male connector is pulled out of the female one, the valve body is closed to shied the inside in the piping, to which the male connector is connected, from outside and to prevent fluid remaining in the piping from flowing out of the male connector.

It is desirable in the case of the above-described coupling that fluid in the container can be shielded from outside every time only an amount of fluid needed is collected from the container into the cup.

In the case of the coupling disclosed in Japanese Patent Disclosure Sho 62-258288, however, the container is usually communicated with the piping through the male and the female connector until the male connector is detached from the female one after the former is connected to the latter. This makes it impossible to shield fluid in the container from outside. Fluid is thus allowed to return from the piping back into the container or bacteria are allowed to enter into the container, so that fluid in the container cannot be kept pure. Further, even when the sucking pump is stopped, fluid remaining in the piping is allowed to drop for a while because the container and the piping are left communicated with each other.

Still further, it happens sometimes that the hermetic seal cannot be broken because of its thickness.

SUMMARY OF THE INVENTION

The object of the present invention is therefore to provide a coupling capable of sealing fluid in the container from outside when the coupling is not connected to the container, preventing fluid from dropping after the sucking of fluid is stopped, and reliably breaking the hermetic seal.

This object of the present invention can be achieved by the following coupling. This coupling is freely detachably attached to the flexible container whose opening or outlet is closed by a seal member broken by the tip of a matter. The coupling comprises cylindrical body provided with a fluid sucking hole at the tip thereof, a valve seat formed in the cylindrical body, a valve body arranged in a fluid flowing path communicated with the fluid sucking hole, and a spring for urging the valve body against the valve seat. When a sucking pump is made operative to suck fluid in the container, the valve body is drawn against the spring to communicate the fluid flowing path with the sucking hole.

In the case of the coupling having the above-described arrangement, the valve body in the cylindrical body is opened when sucking pressure is applied from the sucking pump to the fluid flowing path and it is closed when the supply of sucking pressure is stopped. The sucking pressure is applied from the sucking pump to the fluid flowing path only when a necessary amount of fluid such as fruit juice in the container is to be sucked and collected into a cup. When fluid in the container is under waiting state not to be sucked and collected only by the necessary amount of it into the cup, therefore, fluid in the container can be reliably shielded from outside.

Further, the dropping of fluid can be prevented because the valve body is closed when the supply of sucking pressure is stopped.

Additional objects and advantages of the invention will be set forth in the description which follows, and in part will be obvious from the description, or may be learned by practice of the invention. The objects and advantages of the invention may be realized and obtained by means of the instrumentalities and combinations particularly pointed out in the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings, which are incorporated in and constitute a part of the specification, illustrate presently preferred embodiments of the invention, and together with the general description given above and the detailed description of the preferred embodiments given below, serve to explain the principles of the invention.

FIG. **1** is a partially-sectioned view showing a first example of the male connector according to the present invention;

FIG. **2** is a right side view showing the male connector in FIG. **1**;

FIG. **3** is a partially-sectioned view showing a female connector and a spout;

FIG. **4** is a partially-sectioned view showing the main portions of the male and the female connector wherein the front end of the male connector is fitted into the female connector;

FIG. **5** shows the whole arrangement of a fluid feeder means of the automatic vending machine;

FIG. 6 is a partially-sectioned view showing the main portions of the male and the female connector wherein the hermetic seal is broken by the tip of the the male connector;

FIG. 7. is a partially-sectioned view showing a second example of the male connector according to the present invention;

FIG. 8 is a vertically-sectioned view showing a female connector and a spout cooperated with a third example of the male connector according to the present invention;

FIG. 9 is a vertically-sectioned view showing the third example of the male connector;

FIG. 10 is a plan showing the male connector in FIG. 9;

FIG. 11 is a front view showing the male connector in FIG. 9;

FIG. 12 is a vertically-sectioned view showing such state of the male connector that is about to finish its fitting into the female connector and the spout; and

FIG. 13 is a vertically-sectioned view showing such state of the male connector which has been fitted into the female connector and the spout.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Some embodiments of the present invention will be described in detail with reference to the accompanying drawings.

The whole arrangement of a fluid feeder or supply system of the automatic vending machine or the like shown in FIG. 5 will be described at first. A cylindrical spout 4 is fixed to the pouring outlet of a flexible container 5 and a female connector 3 which serves as an intermediate tap is fitted into the spout 4. The flexible container 5 is transported and housed in the container housing section of the automatic vending machine, while keeping the female connector 3 fitted into the spout 4.

A male connector 1 is inserted and fitted into the female connector 3 of the container 5 which is in the container housing section. One end of the male connector 1 is connected to a sucking pump 7 through a transparent tube 6, and another transparent tube 8 extends above a cup 9 from the discharging outlet of the sucking pump 7.

Because the container is transported with the female connector 3 fitted into the spout 4, a hermetic seal or seal member 10 is bonded to the bottom of the female connector 3 to seal fluid in the container 5.

As apparent from the vertically-sectioned view in FIG. 3 which shows the female connector 3 and the spout 4, the cross section of the spout 4 is cylindrical and one open end of the spout 4 is provided with a collar 11 extending outward in the radial direction thereof. That rim portion of the container 5 which forms the pouring outlet 5*a* is fixed to the collar 11 of the spout 4.

The cross section of the female connector 3 is cylindrical and that portion of the female connector 3 which is adjacent to the container 5 is of double-cylinder structure. More specifically, the female connector 3 is fitted into the spout 4 not to come out of the spout 4 in such a way that an outer cylindrical portion 12 of the female connector 3 is pressed against the inner face of the spout 4 due to the elasticity of the cylindrical portion 12 directing outward in the radial direction thereof and that a stepped portion 19 on the outer circumference of that part of the outer cylindrical portion 12 which is adjacent to the pouring outlet of the container 5 is engaged with that rim portion of the spout 4 which faces the pouring outlet of the container 5. Further, an 0-ring 15 is fitted onto the outer circumference of that part of the outer cylindrical portion 12 which is located on the side of the male connector 1, thereby preventing fluid from leaking between the outer circumference of the cylindrical portion 12 and the inner circumference of the spout 4. On the other hand, the bottom of an inner cylindrical portion 12 of the female connector 3 is provided with a fluid passing opening 14 which has a predetermined diameter and to which the hermetic seal 10 is bonded. Further, the other open end of the female connector 3 is provided with another collar 16 and when the underside of this collar 16 is struck against an open rim portion 17 of the spout 4, the female connector 3 is defined not to shift into the container 5. A recess 18 which serves to position the male connector 1 in the female connector 3 is formed on the inner face of an inner cylindrical portion of the female connector 3.

The male connector 1 shown in FIG. 1 will be now described. The male connector 1 has an outer circumference 20 which can be fitted into the inner circumference of the inner cylindrical portion 13 of the female connector 3. The male connector 1 also has a cylindrical body 25 at the front end thereof and the cylindrical body 25 has a tip 21 to break the hermetic seal 10 bonded to the bottom of the female connector 3. A sucking hole 21*a* is formed in the tip 21 of the cylindrical body 25. A valve body 22 held movable in the axial direction of the cylindrical body 25 and a spring 23 for urging the valve body 22 toward the tip 21 of the body 25 are housed in the hollow of the cylindrical body 25. Further, a cap 24 is inserted and screwed from outside or opposite to the tip 21 into the cylindrical body 25. A fluid path 38 communicated with the sucking hole 21*a* of the tip 21 is formed on the outer circumference of the cap 24 and a front end 26 of the cap 24 is screwed into the hollow at the intermediate portion of the cylindrical body 25. The front end 26 of the cap 24 serves as the seat of the spring 26 which urges the valve body 22 toward the tip 21 and against a seat 35. A head 27 of the cap 24 is embedded in a recess on the rear open end of the cylindrical body 25 to cooperate with an O-ring 28 to hermetically seal the rear open end of the cylindrical body 25. As shown in FIG. 2, the head 27 of the cap 24 is provided with a groove 40 into which the tip of a tool is fitted to screw the front end 26 of the cap 24 into the hollow of the cylindrical body 25.

A cylindrical hose nipple 29 is screwed into the underside of the cylindrical body 25 to communicate with the fluid path 38 of the cap 24 and the transparent tube 6 is attached to the other end of the hose nipple 29. An O-ring 30 is fitted onto that portion of the hose nipple 29 which is screwed into the cylindrical body 25 so as to prevent the leakage of fluid.

The front end of the valve body 22 is shaped conical and directed toward the tip 21 of the cylindrical body 25. When the male connector 1 is not connected to the female connector 3, the front end of the valve body 22 is urged to the tip 21 by the spring 23 to close the fluid passage in the cylindrical body 25.

The spring 23 has a spring constant smaller than the sucking pressure of the pump 7. When this sucking pressure is applied from the pump 7 to the valve body 22 through the transparent tube 6 and the path 38 on the cap 24, the valve body 22 is caused to open the fluid

passage in the cylindrical body **25**. The valve body **22** is provided with a hole **31** which allows fluid sucked through the tip **21** when the fluid passage in the cylindrical body **25** is opened to pass therethrough.

As shown in FIG. **4**, the front end of the male connector **1** is fitted into the inner cylindrical portion of the female connector **3** and a Y-shaped packing **32** is fitted onto the the front end of the male connector **1** to prevent the leakage of fluid when the male connector **1** is fitted into the female one **3** in this manner. Further, a protrusion **39** is formed on an outer circumference **20** of the male connector **1** to fit into a recess **18** on the inner face of the inner cylindrical portion **13** of the female connector **3**.

The tip **21** of the cylindrical body **25** has a length L so long enough in the axial direction thereof as to prevent it from being closed by the hermetic seal **10** sucked by the sucking pressure of the pump **7** when the seal **10** is broken by it.

The operation of the above-described embodiment will be described.

When the male connector **1** is disconnected from the female one **3**, their movable parts are under such condition as shown in FIGS. **1** and **3**. When the male connector **1** is inserted, as shown in FIG. **4**, into the female connector **3** under this state until the former's front stepped portion **33** is struck against a flange **34** of the inner cylindrical portion **13** of the latter, the hermetic seal **10** begins to be broken by the tip **21** of the cylindrical body **25** of the former and when the length of the male connector **1** inserted into the female one **3** reaches the valve of L, the hermetic seal **10** is broken to an opening whose size is same in diameter as a fluid passing unite **14** of the female connector **3**, as shown in FIG. **6**. At the same time, the protrusion **39** on the outer circumference of the male connector **1** is fitted into the recess **18** on the inner face of the inner cylindrical portion **13** of the female connector **3** and the male connector **1** is thus fitted into the female one **3**. Y-shaped packing **32** serves this time to hermetically seal between the inner face of the inner cylindrical portion **13** of the female connector **3** and the outer circumference of the male connector **1**.

When the pump **7** is made operative to pick up a necessary amount of fluid from the container **5** into the cup **9** and sucking pressure is applied to the fluid path **38** on the cap **24** through the transparent tube **6** and the hose nipple **29**, the sucking pressure overcomes the elasticity of the spring **23** and the valve body **22** is drawn toward the side of the cap **24**. The valve body **22** is thus cause to open the fluid passage in the male connector **1**. Fluid in the container **5** is there-fore sucked into the transparent tube **6**, passing through the broken hermetic seal **10**, a space outside the outer circumference of the valve body **22**, a hole **31**, a cut-away portion **26***a* of the front end **26** of the cap **24**, the path **38** and a hollow **29***a* of the hose nipple **29**, and then into the cup **9**, passing through the pump **7** and the transparent tube **8**.

When the pump **7** s stopped just after the necessary amount of fluid is fed into the cup **9**, the elasticity of the spring **23** becomes larger than the sucking pressure of the pump **7** and the valve body **22** is thus urged toward the side of the tip **21** to close the fluid passage in the male connector **1**. Even if the hermetic seal **10** is broken, therefore, fluid in the container **5** can be kept sealed from outside by the valve body **22**. When fluid in the container **5** is sealed from outside in this manner, bacteria can be reliably prevented from entering from the transparent tube **6** into the container **5** and fluid reliably in the transparent tube **6** can also be reliably prevented from flowing back into the container **5** to reduce the purity of fluid in the container **5**.

Further, the valve body **22** closes the fluid passage in the male connector **1** at the same time when the supply of sucking pressure is stopped. This prevents fluid from continuing to drop into the cup **9**. Still further, no fluid is caused to remain in the transparent tubes **6** and **8**. This can decelerate the speed at which these tubes **6** and **8** are made unclean.

The male connector **1** shown in FIG. **1** is shaped like an L, attaching the hose nipple **29** to the cylindrical body **25** at the right angle, but as apparent from a second embodiment of the present invention shown in FIG. **7**, it may be arranged that the cap screwed into the cylindrical body **25** is formed as a hollow cap **36** and that the transparent tube **6** is connected to an open end of the cap **36**. Fluid is introduced into the transparent tube **6** through the hollow of the cap **36** in this case. Same components as those in FIG. **1** are represented by same reference numerals in FIG. **7**.

A third embodiment of the present invention will be described.

A female connector **120** is connected into a spout **112** in FIG. **8**. The open base of the spout **112** is provided with a collar **114** which is air-tightly fixed to the pouring outlet of a container **102**.

In the case of this example, a protrusion ring **116** is formed on that portion of the outer circumference of the spout **112** which is on the side opposite to the pouring outlet of the container.

That half of the female connector **120** which is on the side of the container is of double-cylinder structure and an outer cylindrical portion **122** is pressed against the inner face of the spout **112** due to the elasticity of the cylindrical portion **122** itself. When a step **123** on that open end of the outer circumference of the cylindrical portion **122** which is on the side of the pouring outlet of the container is engaged with the rim of the open base of the spout **112**, the female connector **120** can be kept not to come out of the spout **120**. An O-ring **124** is fitted onto the cylindrical portion **122** to establish sealing between the female connector **120** and the spout **112**.

The bottom of an inner cylindrical portion **125** is provided with an opening **126** which has a predetermined diameter and which is closed by a seal member **128** relatively easily opened by a sharp tip.

The other open end of the female connector **120** is provided with a collar **129**, which covers a rim **118** of the open end of the spout **112** and stops the female connector **120** from falling into the spout **112**.

In FIG. **9**, the front portion of a male connector **130** comprises a main cylindrical body **131** having an outer circumference **133** engaged with the inner cylindrical face of the female connector **120**, a cross-shaped tip **134** at the front end thereof to break the seal member **128**, and a cylindrical portion **132** of small diameter provided with fluid passing holes **135**; a valve body **140** urged toward the tip **134** of the main cylindrical body **131** by a compression coil spring **144** and held movable in the axial direction in a fluid flow path **139** of the main cylindrical body **131**; a sleeve **170** held freely rotatably on the outer circumference of the main cylindrical body **131** and fitted onto the spout **112** when the male connector **130** is connected to the female one **120**; and a lock ring **190** held in a clearance **174** between the sleeve **170**

and a cover **180** freely detachably capped on the front of the sleeve **170** so as to slide in a direction perpendicular to the axial direction of the main cylindrical body **131**.

On the other hand, the rear portion of the male connector **130** comprises a rear cylindrical body **150** fitted onto the rear end of the main cylindrical body **131** and provided with an adapter **160** which is screwed into the outer circumference of the body **150** at right angle; and a cap **152** having a front portion **153** provided with chamfered parallel faces **156** thereon to allow the flow of fluid, screwed into the rear end portion of the main cylindrical body **131**, and provided with a collar **159** at a head **154** to press the rear cylindrical body **150** from backside and an O-ring **157** to establish sealing between the rear cylindrical body **150** and the cap **152**.

Further, an O-ring **138** is fitted onto the front outer circumference of the main cylindrical body **131** to seal the inner circumference of the female connector **120** when the male connector **130** is connected to the female one **120**. Still further, a protrusion ring **137** on the rear outer circumference of the main cylindrical body **131** serves to stop the sleeve **170** freely rotatable. The protrusion ring **137** is shaped like a circle as shown in FIG. **11**, but it may be shaped polygonal to stabilize the attaching angle of the sleeve **170** relative to the main cylindrical body **131**. That inner circumference of the sleeve **170** which is contacted with the polygonal protrusion ring **137** is also shaped polygonal in this case.

The front end of the valve body **140** fitted into the main cylindrical body **131** is shaped like a top-chipped cone, directing in the direction of the tip **134**, and it is urged toward the tip **134** by the compression coil spring **144** to close the fluid passing path **139** in the main cylindrical body **131**. Reference numeral **142** represents a fluid hole passing through the valve body **140** from the outer circumference thereof in the diameter direction thereof and allowing fluid, which is sucked through the fluid passing holes **135** at the cross-shaped tip **134** when the valve body **140** opens the path **139** in the main cylindrical body **131**, to pass therethrough.

The spring constant of the compression coil spring **144** which urges the valve body **140** is set such a value that causes the valve body **140** to move a distance needed to pick up fluid in the container **102** when the pump (not shown) is made operative. When the pump is made operative, therefore, the valve body **140** is moved the predetermined distance to open the fluid passing path **139** and when the pump is stopped, the path **139** is completely closed but the compression coil spring **144** may not be so strong.

The diameter of an inner circumference **191** of the lock ring **190** is a little larger than the outer diameter of the spout **112** and as shown in FIG. **11**, a semi-circual projection **192** is projected from the inner circumference of that end of the lock ring **190** which is directed in its sliding direction so as to be engaged with the protrusion ring **116** on the outer circumference of the spout **112**. The lock ring **190** also has a pressing section **194** on the outer circumference of its free end at a position opposite to the projection **192**. That face of the projection **192** which is contacted with the outer circumference of the spout **112** is chamfered, which makes the movement of the male connector smooth when it is connected to the female connector. That face of the projection **192** which is engaged with the protrusion ring **116** is made flat and perpendicular to the axial center line of the main cylindrical body **131** not to separate the male connector from the female one because of slight force added after the male connector is connected to the female one.

A compression coil spring **176** is arranged between the pressing section **194** of the lock ring **190** and the sleeve **170** with its lower half embedded in a circular hole **178** on the outer circumference of the sleeve **170**. The lock ring **190** is urged upward in FIG. **9** by the compression coil spring **176**, contacting its shoulder **196** with the inner circumference of the cover **180** while engaging its projection **192** with the protrusion ring **116** of the spout **112**. When the lock ring **190** is pushed against the compression coil spring **176**, the projection **192** is plunged into the sleeve **170**, thereby releasing the spout **112** from its engaged state.

The end face of the front end **153** of the cap **152** serves as a seat for the compression coil spring **144**, which urges the valve body **140** toward the tip **134** of the formed on the outer circumference of the cap **152** except on that of the head **154**. The head **154** of the cap **152** is provided with a groove **158** into which the tip of a tool is fitted when the front portion **153** of the cap **152** is screwed into the main cylindrical body **131**.

The adapter **160** having having a fluid flow path **161** therein is screwed onto the rear cylindrical body **150** through an O-ring **162** and the path **155** is communicated with the pump through the tube **106** connected to the adapter **160**.

It will be now described how the third embodiment of the present invention operates.

In order to connect the male connector **130** to the spout **112** and the female connector **120**, the front end of the main cylindrical body **131** of the male connector **130** is inserted at first into the female connector **120**. When the tip and smaller-diameter cylindrical portion **134** and **132** are pushed into the opening **126** of the female connector **120**. The seal member **128** which seals the opening **126** is broken by the tip **134**. The sleeve **170** encloses the outer circumference of the spout **112** this time, while striking the projection **192** of the lock ring **190** against the protrusion ring **116** on the spout **112**. The front face of the projection **192** is chamfered as described above. As the male connector **130** is inserted into the female connector **120**, therefore, the protrusion ring **116** pushes the projection **192** as shown in FIG. **12** and the lock ring **190** moves to projection the projection **192** into the sleeve **170** against the compression coil spring **176**.

When the main cylindrical body **131** is further inserted into the female connector **120**, the projection **192** passes over the protrusion ring **116** and the lock ring **190** is returned to its original position by the compression coil spring **176** while the projection **192** is engaged with the backside of the protrusion ring **116**, as shown in FIG. **13**.

When the male connector is connected to the female connector and the spout in this manner, the front step **136** of the main cylindrical]body **131** is struck against the bottom **127** of the inner cylindrical portion **125** of the female connector **120** and sealing is established between the inner circumference of the female connector **120** and the outer circumference of the main cylindrical body **131** by the seal ring **138**.

When the adapter **160** and the pressing section **194** of the sleeve **170** are not directed in desired directions after or upon the connection of the male connector to the female one, both or one of the sleeve **170** and the rear cylindrical body **150** are (or is) rotated round the main

cylindrical body **131** to adjust these directions of the adapter **160** and the pressing section **194**.

When fluid is to be picked up from the sealed container **102**, the pump is made operative to apply sucking pressure to the fluid passing path **155** through the tube **106**. The sucking pressure overcomes the elasticity of the compression coil spring **144** to suck the valve body **140** toward the cap **152**. As the result, the fluid passing path **139** is communicated with the paths **155** and **161** and fluid in the container **102** is thus collected in the cup, passing through the holes **135** at the tip **134** of the main cylindrical body **131**, the fluid passing path **139**, the hole **142** in the valve body **140**, the paths **155**, **161** and the tube **106**.

When the pump is stopped after the predetermined amount of fluid is collected in the cup, the elasticity of the compression coil spring **144** acts on the valve body **140** at once, causing the valve body **140** to close the fluid passing path **139**. Fluid in the container **102** can be completely shielded from outside by the valve body **140** under this state.

When the male connector **130** is to be detached from the spout **112** and the female connector **120**, the pressing section **194** is pushed against the compression coil spring **176** to release the projection **192** of the lock ring **190** from the protrusion ring **116** of the spout **112**. The male connector **130** is then pulled out of the female connector **120**.

Additional advantages and modifications will readily occur to those skilled in the art. Therefore, the invention in its broader aspects is not limited to the specific details, and representative devices, shown and described herein. Accordingly, various modifications may be without departing from the spirit or scope of the general inventive concept as defined by the appended claims and their equivalents.

What is claimed is:

1. A dispensing coupling for a container comprising a female connector having an opening closed by a seal, and adapted for detachable attachment to the container;

a male connector having a main cylindrical body portion and a rear cylindrical body portion, said main cylindrical body portion provided with a tip portion, said main cylindrical body portion and said tip portion adapted to be inserted into said opening to break said seal, said tip portion having a hole for sucking fluid from the container; p1 a valve seat formed in said main cylindrical body portion;

a valve body arranged in a fluid passing path in said rear cylindrical body portion and movable relative to said main cylindrical body portion and said tip portion, said valve body in fluid communication with said hole;

a spring for urging said valve body toward said opening and said valve seat to thereby maintain said valve body engaged with said valve seat upon insertion of said male connector into said female connector; and

wherein when a sucking pump is made operative to suck fluid from the container, said valve body is drawn toward and against said spring to disengage the valve body from the valve seat and thereby communicate said fluid passing path with the container, said coupling further comprising a spout having a protrusion ring on its outer circumference, said spout serving to attach said female connector to the container;

a sleeve rotatably fitted onto the outer circumference of said main cylindrical body portion of said male connector;

a lock ring arranged perpendicular to the longitudinal direction of said male connector and provided with a projection on its inner face to engage with a side of the protrusion ring, so as to fix said sleeve to said spout and;

a compression coil spring for urging said lock ring in the diameter direction of the ring.

2. The coupling according to claim **1**, further including a cap member removably secured in a rear end opening of said main cylindrical body portion and serving as a seat for one end of said spring.

3. The coupling according to claim **1**, further comprising a hose nipple attached to a side wall of said main cylindrical body portion.

4. The coupling according to claim **2**, wherein said cap member has a hose connecting section.

5. The coupling according to claim **1**, further comprising a Y-shaped packing arranged on the outer circumference of said main cylindrical body portion.

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